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Determinants of Firm Leverage: Further Evidence from China

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Introduction[1]

China's economic reforms have substantially changed the industrial organization and management of firms. Under central planning, state-owned enterprises dominated economic activity with urban and rural collectives on the fringe. Today, the evolution of ownership forms and firms' relationships to the market and government has created a range of firm types. This process of privatization and modernization of firms has been particular to China. It was not until the mid-1990s that the need to privatize was accepted and only in the 2000s that the government officially recognized private property by writing the right of private ownership into the constitution.

In the mid-1990s, China's central leaders also initiated bank reforms in conjunction with public finance reform.[2] Financial sector development lagged other aspects of market reforms with distortions in the price of capital and other constraints (Allen, Qian and Qian, 2005; Aziz 2008). Reforms of state owned enterprises also hit a critical juncture at this time, as reflected in the 1994 Company Law. By 2001 over 80 percent of state enterprises had been through some form of reform and over 50 million state employees had lost their jobs (Li and Putterman 2008, p.356).

Control over investment decisions by the government is a key characteristic of a planned economy. Decentralizing investment to firms via freedom to invest retained profits, take out

[1] We would like to thank the Shanghai Academy of Social Sciences for their feedback on this paper during a seminar hosted at the Academy in November, 2011.

[2] For a full description of these reforms and economic transition in China generally see Naughton (2007).

loans, utilize equity markets and seek venture capital funding is a critical step in a market transition. Changes in the rules for corporate governance along with market competition continued to force companies to transform. The changes at some companies were faster than their classification, so that some state companies were probably behaving like private firms before they were recognized as such (Dollar and Wei 2007, p.3). A study by Bai et al. (2009) found that just having issued some percentage of shares to private investors gave sufficient incentives to increase profits and exhibit other market driven outcomes, and Matthews et al. (2009) found that joint-stock banks performed better than state-owned banks. Kato and Long (2006) found that privately-controlled listed firms exhibited a closer match between CEO turnover and firm performance than state-controlled listed firms, and that independent boards were positively related to CEO turnover and performance.

Most companies, however, were reforming despite not being listed on one of the two exchanges. Studies reviewed by Li and Putterman (2008) found improved performance as measured by profitability and productivity, although there was evidence of continued influence of the state on how these companies operated, mostly in a way that enhanced profitability. Examining investment efficiency across firm types, however, Dollar and Wei (2007) find that state firms continue to have lower returns to capital than private firms. Even within the banking reforms passed in 1994 there was no procedure outlined for private firms to apply for funding without government sponsorship of some type. Only in 1997 did the regulations change to allow banks to loan to private firms (Firth et al. 2009, p.1146). In cross-country comparisons, China's ranking in terms of access to financing is quite low (Salvatore 2010).

The purpose of this paper is to explore the determinants of Chinese domestic firms' leverage positions using a sample survey of manufacturing firms that are overwhelmingly

unlisted from the mid-2000s—a decade after the loan options opened up. Studies of leverage determinants in China to date have focused on the small number of listed firms or the behavior of foreign firms in China (Chen 2004, Tong and Green 2005, Huang and Song 2006, Ni and Yu 2008, Li et al. 2009, Liu et al. 2011). To our knowledge, the only study of leverage that focused on non-listed domestic firms (Keister 2004) investigated firm-borrowing of former state owned enterprises using a much older data set for the period of 1980-1989. Our sample contains not only Chinese domestic firms that are largely unlisted, but also provides new evidence with more recent data. In addition, our study adds insights into the leverage determinants of firms of different ownership types, adding to the results of earlier studies on a small number of listed firms.

Foreshadowing our results, we find that the pecking order theory explains leverage fairly well in the case of China's private firms' financing, but leverage is also heavily influenced by ownership forms and the market environments in which firms operate. This diverging behavior between private firms and others suggests that market and financial reforms are incomplete in China. Leverage determinants of private firms, especially small and medium-sized (SMEs) private firms are explained the best by the theory. In contrast, state-owned firms' leverage is not explained well at all, and the results for mixed ownership firms were similar to the state firms.

In the next section of the paper we discuss the theoretical capital structure research to justify the application of the pecking order theory and to develop a series of testable hypotheses appropriate for China's phase of economic transition. The third section presents our data and estimation procedure. The fourth section discusses the results, and the final section summarizes our findings and their implications.

Research on Firm Capital Structure

A number of major theories of capital structure are debated within the literature, including pecking order theory, trade-off theory, market timing theory and signaling theory. For privately-held firms only the first two are relevant, since market timing and signaling theory deal with incentives to issue shares. The pecking order theory postulates that firms prefer to use retained profits for funding over banks loans because of asymmetric information or transaction costs, or both (Myers 1984; Titman and Wessels 1988, p.6; Sogorb-Mira and Lopez-Gracia 2003, pp.7-8). The third option, issuing equity to outside sources, is the last choice whether because of preferences to maintain control or constraints on firms in the ability to issue shares. The trade-off theory focuses on a firm's choice between gaining tax benefits from interest payments on debt and the costs of possible financial distress if the firm is indebted to a bank.

These fundamental capital structure theories have been widely tested with empirical data from the U.S. and other developed countries. For example, Rajan and Zingales (1995) extended the empirical evidence largely based on firms in the United States to the G-7 countries, where they use four key variables to investigate the capital structure determinants: the tangibility of assets, market-to-book ratio, the logarithm of sales as a size proxy and a profitability measure. They found that key factors that were related to firm leverage in the U.S. seemed similarly related in other countries as well.

Following Rajan and Zingales' cross-country studies, Booth et al. (2001) examined factors that impact capital structures in developing countries. They found that the most successful predictor of firms' leverage is profitability. They conclude that firms' capital structure choices in the ten developing countries they studied are affected by the same variables as in developed countries.

These types of studies lay out the empirical foundation to investigate firms' financing choices, but they focus on publicly listed firms. Recently, using data on U.S. private firms, Cole (2008) tests the pecking order and trade-off theories and finds more support for the pecking order theory. Within the Chinese context, the pecking order theory also appears to be the more appropriate framework for analyzing Chinese firms. One reason for this proposition is that a very small percentage of firms in China are publically listed. Only 1,500 or so firms are traded on China's two exchanges, and by some estimates fewer than 15 percent of those are privately-controlled (Kato and Long 2006). Even within the group of listed Chinese firms, two studies argue that the trade-off theory is not relevant (Chen, 2004; Ni and Yu 2008) while one argues that it is (Huang and Song 2006). Based on data for listed firms only, Ni and Yu (2008) find limited evidence for the pecking order theory (only in large listed firms), while Tong and Green (2005) find stronger evidence for it based on a database of 44 traded companies. Although Ni and Yu (2008, p.110) find that the pecking order fits with large firms only, they indicate this result seem unusual as this theory is more suitable for small companies as they were be expected to function in a context with more serious asymmetric information. As we are focusing on the possible differentiating characteristics between private and state firms, and the fact that thousands of private firms are not listed, we feel the pecking order theory is the better starting point.

A second reason is that foreign firms benefit more than domestic firms from tax breaks. A paper by Li et al. (2009), using survey data for Chinese firms similar to ours, focused on comparing the capital structure of state-owned companies with that of foreign owned firms.[3]

[3] They use data from 2000-2004 while ours is from 2003-2006.

They found that state firms were relatively highly leveraged but that firms with foreign ownership have relatively low leverage. They argue that the results with respect to foreign firms are consistent with the trade-off theory because during the period under investigation, foreign firms paid lower tax rates than domestic firms. Foreign firms also have funding options from outside the country in which they are located. In this study we focus on the development of domestic, private firms in China as compared with state-controlled companies and their financing choices within China, and therefore we do not include firms with foreign ownership. This makes the trade-off theory less relevant.

For these reasons, given the nature of China's economic transition, we believe that the pecking order theory is the most appropriate framework to explore how leverage is determined across ownership types and across regions. The pecking order theory as well as the existing studies on capital structure provide several key determinants of leverage as summarized in table 1 (Cole, 2008, pp.10-13). The more profitable firms are, and the more financial slack (such as cash reserves) firms have, the less leverage we would expect them to use since they would have access to more internal financing. Expectations about good growth prospects also would lead to less leverage if that growth was expected to generate retainable profits. In contrast, the larger a firm and the more tangible assets a firm has, and firms that are in industries with higher average leverage ratios, the more leverage we would expect them to use. Larger firms, and firms with more tangible assets, are expected to be able to borrow more easily and at lower costs than smaller firms because they pose lower risks to banks both in terms of providing more information to evaluate risk (fewer informational asymmetries between insiders and outsiders) and having more collateral to repay creditors should bankruptcy occur. The average leverage ratio varies by industry and represents a target leverage level for firms. Finally, firm age could

lead to either a positive or negative relationship. The older the firm, the more leverage they would be expected to use because they would have better access to loans given they would have had time to establish a track record. On the other hand, younger firms typically do not have much liquidity and so need to rely on bank loans more.

(Insert Table 1 here)

While we recognize that there are different forms of capitalist firms (Chan and Unger, 2009), there are certain basic expectations of firm behavior in a market economy such as a need to make a profit to stay in business. We expect that private firms are the most likely to meet this criteria in China. However, because the Chinese approach to reforms has been to push state firms to function with hard budget constraints in a market economy, one outcome might be that by the 2000s, different ownership forms behaved in similar ways as reflected in their determinants of leverage. Since these changes may be difficult to make for old style state firms, we also might expect that newly established state firms would behave differently than well established ones. Likewise, firms that operate in an institutional environment that is more market-oriented are more likely to have leverage determinants similar to private firms in a market economy such as the U.S. In China, the coastal areas are the most advanced institutionally, followed by the northeast and then the inland areas.

These expectations are stated as the following hypotheses, H1-H5.

(H1) If reforms have been successful at inducing market behavior, the amount of leverage firms of all ownership forms should exhibit leverage determinants as the pecking order theory predicts.

(H2) If H1 is rejected, and if small and large private firms have different leverage determinants, then large private firms in China have more similar leverage determinants to state firms.

(H3) Because new firms would be less likely to have managerial history with the former planned system, young state firms have more similar leverage determinants to private firms than older state firms.

(H4) If reforms have been successful system-wide to establish market-oriented institutions, firms' leverage determinants should be similar for firms in different geographical regions.

(H5) If H4 is rejected, then the coastal areas that received priority with reforms and therefore tend to be more marketized would more clearly exhibit leverage determinants as the pecking order theory predicts.

Data and Estimation

To test these hypotheses we utilize industrial firm level data from the Chinese National Bureau of Statistics (NBS) covering the period of 2003 to 2006.[4] This data set is one of the most

[4] This dataset is known as the "Industrial Microdata" in English.

comprehensive on China's manufacturing industry. Unlike many available data sets that cover the approximately 1500 publicly listed firms in China, this database covers all state-owned firms and registered non-state-owned firms with annual sales above 500,000 Yuan. It provides detailed information about each firm's year-end financial statements and the firm's characteristics, including NBS's manufacture industry code,[5] organizational form, firm age, number of employees, location, etc. The appendix tables A1-A4 provide the descriptive statistics for our variables.

The organizational forms reported are: state-owned, collectively-owned, stock cooperative enterprises, jointly operated enterprises, limited liability companies, companies limited by shares, private firms of different organizational forms, and enterprises established by foreign investors. For our purposes we divide the firms into three ownership categories: state-owned enterprises (SOE), mixed state-owned and private. The SOE category is wholly state-owned with approximately 13,000 firms (category 110 in Tables A3-A4); the mixed category includes all of the hybrid state-owned firms that have issued shares or have other types of alliances and therefore are not considered wholly state-owned for registration purposes with approximately 45,000 firms (categories 120-160); and private firms with approximately 45,000 firms (categories 171-174).[6] We exclude all foreign invested firms.[7]

Several other characteristics from the appendix tables need to be highlighted. First, short-term loans are much higher than long-term loans.[8] Measured in terms of share of assets,

[5] This industrial classification is similar to the standard industrial classification (SIC) used internationally.
[6] Note that the number of observations varies by year and variable.
[7] Firms included in the survey are not stable over time. Hence in one year the set of firm IDs will not fully match those in another year if a firm went out of business. For this reason, estimations that include lagged values and variables that measure change over time will drop some of the observations.
[8] Long-term loans are for one year or more.

for all of the firms in the survey for all four years, the average long-term loans to assets ratio was only 5 percent while for short term liabilities as a share of assets it was 51 percent. The long-term loan to asset ratios for private firms and mixed ownership firms are only 6 and 4 percent respectively, while both types' short-term loan to asset ratios were 58 percent. Compare this to small public firms in the U.S. where the long-term loan to asset ratio varied from 11 percent in 2003 to 20 percent in 1987, while total loans to the asset ratio varied between 44 and 57 percent (Cole, 2008, p.20). So while total loans to assets are comparable, in China there is apparently a strong bias towards short-term borrowing.[9] Given the character of the loan structure in the Chinese case, we use the ratio of short-term liabilities to assets as our main variable of inquiry.[10]

Second, the mean profit (measured as return on assets) for wholly-owned state firms is 1 percent, while mixed ownership and private firms have mean positive profit at 8 and 11 percent respectively. SOE firms in the northeast region on average lose money and in inland areas profit is just barely above zero. In this data set, half of the wholly-owned state firms reported zero or negative profits, while only 10 percent of the private and the mixed ownership state firms reported zero or negative profits. So although progress has supposedly been made in terms of commercializing state companies, there apparently are many that continue to survive without being profitable. The successful, so-called, "champion" national firms are more likely to fall into the mixed ownership category because most of them have issued shares on one of the exchanges, or have some foreign investment or other ownership characteristic that means they

[9] Anecdotally, it has been reported that short-term funds are often mismatched with long-term projects. Communication with Standard Chartered, Shanghai, 18 May 2010.

[10] The correlation coefficient between long-term and short-term debt in our data is .9. In addition, we ran the same set of regressions using total loans to asset ratio as the dependent variable. We find the results very similar to those presented here.

are no longer wholly state-owned.

Finally, tangible assets as a percent of total assets are higher for SOE firms than for the other ownership forms. For SOEs this percent is almost at 50 as compared with 36 percent for private firms. From the regional comparison we can see that SOEs in the northeast and inland areas have the highest ratios of tangible assets to total assets.

Based on our theoretical framework and the particular characteristics of this data set, our estimated equation is given as equation (1). The dependent variable to capture **leverage** (LV_{it}) is total short-term loans as a percent of total assets for firm *i* in year *t*. **Profit** is measured as the return on assets. The **Sales** variable represents financial slack or access to liquid assets, and is measured as sales revenue. **Size** is the number of employees which measures firm size; **Assets** are tangible assets as a percent of total assets, which is our measure of firm collateral; and **AvgLV** is the industry median leverage ratio; **Age** is measured as the log of each firm's age. These independent variables (except for size) are lagged one year, under the assumption that a loan decision would be made on last year's performance rather than current performance, whether the bank or the firm's management was making the decision.[11]

Equation (1) will be estimated for each ownership group and region, and by size and age, to test our stated hypotheses. We define large private firms as those having assets of 20,714 Yuan, which represents the top 25 percent of the private firms in this data set. We define young firms as those that were established in 1996 or later, which is after the major company reforms

[11] With the data set available, we do not have an independent measure for growth prospects. Berkman et al., (2009) and Ni and Yu (2008) used asset growth to capture growth potential in the case of China and Cole (2008) used change in employment. However, because we are using lagged variables, we are wary of adding a growth variable to capture potential growth for firms. In addition, our sales revenue variable may be a proxy for growth as well as for available liquid assets.

aimed at creating incentives for market behavior were in place. The survey defines the firms by three regions: (1) is the northeast and includes Heilongjiang, Jilin and Liaoning; (2) is the coast and includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangzhou, Hainan; and (3) is the inland areas and includes Shanxi, Neimenggu, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

The estimation procedure is based on pooled time series and cross-sectional data with fixed effects by firms, using truncated data that dropped the outliers below 5 percent and above 95 percent as well as those observations that were obviously wrong.[12]

Equation (1):

$$LV_{it} = \beta_1 + \beta_2 Profit_{i,t-1} + \beta_3 Sales_{i,t-1} + + \beta_4 Assets_{i,t-1} + \beta_5 Size_{i,t} + \beta_6 Age_{i,t-1} + \beta_7 AvgLV_{i,t-1} + \mu$$

Where *i*= firm; *t* = time period.

Results

Tables 2-6 present our results. The first set of results is for private firms. Column (3) in table 2 presents the results for the full set of private firms in the survey, with large private firms presented in column (4) and small and medium-sized (SME) private firms presented in column

[12] For example, if a firm reported zero assets.

(5). Profit is significant and negative as expected in all three cases. Sales revenue, our measure for financial slack, is also significant and negative as expected. Firm size is significant and positive for the subset of SME private firms, but is insignificant for large private firms and all private firms. The average leverage of each group of firms is positive and significant, as expected. The age variable is negative and significant for the full sample and for SMEs, suggesting that smaller private firms need more leverage perhaps because they are younger. All of these results are fairly consistent with the pecking order theory.

The one result that is inconsistent with the theory is the tangible asset variable, which was expected to be positive but here resulted in significant, negative coefficients in all three cases. The pecking order theory suggests that tangible assets signal collateral that would increase the chances, and/or lower the costs, of acquiring a loan. In the case of this data set in China, something else seems to be going on. Here we see the higher the ratio of tangible assets to total assets, the less likely a firm is to take out a loan. Our expectations concerning tangible assets assume that banks in China would try to recover some losses if a loan is not repaid. This in fact may not happen very often. In addition, with the state sector, policy directives ensure bank support to the targeted companies to prevent bankruptcies. Banks may then shy away even more than usual from loaning to the risky private sector, and/or small and medium-sized sector, to keep their balance sheets reasonable. The Li et al. (2009) paper also reported this result with their similar survey data but did not address any reason or implications. Interestingly, Liu et al. (2011) found negative coefficients for their assets variable with total leverage and short-term leverage, and positive coefficients with long-term leverage and bank loans as their dependent variables. Chen (2004) also found the asset variable to be insignificant with her pooled estimation of 88 listed firms between 1995 and 2000 using total leverage as the dependent

variable, but to be significant and positive with long-term leverage as the dependent variable. Using data from 1200 Chinese listed firms, Huang and Song (2006) found a positive relationship between tangible assets and market-valued total liabilities in only one of their models, and the relationship was insignificant in their other specifications. A key difference between their studies and ours is that their data included only listed firms, which are overwhelmingly state firms. Hence the size of tangible assets in the private sector may be indicating a better run firm, or one with more resources, rather than one that could repay a loan with assets if need be.[13] Alternatively, there could be something about the nature of short-term debt in China that is behind these unexpected results.[14]

Overall, then, the results in table 2 suggest that private firms with more profit, higher sales revenue, a higher percentage of tangible assets, and those that are smaller and older, use less leverage. Size and age do not explain leverage for large private firms. Except for the expectations relating to tangible assets, the capital structure of this set of firms is explained well by the pecking order theory, especially for SME private firms.

Table 3 presents the results for the wholly-owned SOE firms. Looking at column (3) we can see that wholly-owned state firms overall do not fit the expectations of the pecking order theory. The profit variable is negative and significant and the tangible asset variable is significant and negative as was the case with the private firms. The other variables are all insignificant. With the profit variable, however, we need to be careful with the interpretation of the results in this case. For example, it could be that firms that made less profit received more loans, resulting in a significant, negative coefficient on our profit variable. That is quite different

[13] The ratio of tangible assets variable is positively correlated with the profit variable with a coefficient of .7.
[14] Note that Tong and Green (2005) and Ni and Yu (2008) do not include tangible assets in their discussion or estimations.

than firms who make enough profit that they can self-finance, and therefore have less liability. The negative coefficient on profits for all of these categories of firms is quite large ranging from .10 to .25 as compared with the private firms whose profit coefficients were in the .03 to .05 range. Based on what we know about the low average profits in this sector, the negative coefficient may mean that even non-profitable state companies received loans. In fact, the less profitable firms may be more likely to receive loans if government policy uses state companies to ensure employment or other outcomes, and is willing to pay for this through guaranteed loans from the state banking system. The tangible asset variable is also significant and negative for all SOEs except the young firms as was the case with the private firms, although again—and maybe especially in this case—it does not seem likely that tangible assets are signaling available backup collateral in case of firm failure. Finally, the results for young wholly-owned firms (column 4) show that profits and size were significant but nothing else. In other words, in contrast to our expectations, young, wholly-owned state firms do not seem to have similar factors determining their capital structure as private firms.

The results for the mixed ownership firms (columns 5 and 6) are not much different than for the wholly-owned state firms. Profits, tangible assets and the mean industry average are significant for all mixed ownership firms and for the young mixed ownership firms, whereas age, size and sales revenue did not matter. Bai et al. (2009) reported that firms with some move towards partial privatization seemed to have incentives to behave more like private companies with hard budget constraints. Our results do not strongly support this. Huang and Song (2006) also conclude from their study of listed firms in the 2000s in China that listed state firms do seem to be profit-maximizers, but again, most of our state firms are not listed and do not seem to be profitable overall.

Relating these results to our set of hypotheses, we do not find support for H1-H3. Firms of different ownership forms have different leverage determinants with little evidence that state firms behave similarly to private ones in terms of capital structure. Even the results for the young state firms were more similar to the wholly-owned state firms than to the private firms, as were the mixed ownership firms.

(Insert Tables 2-3 here)

Tables 4-6 present our results for the regional analysis which reflects institutional development. Looking first at private firms in table 4, column (3) presents the results for the coastal area, the most marketized area of China. All the variables except for firm size are significant and consistent with our expectations overall. Except for the sign of the tangible assets coefficient as was the case in the first set of results, this set of results fits the pecking order theory very well. Comparing the coastal region with the northeast sample, the size of firms becomes significant and the age of the firms became insignificant (column 4). For firms in the inland areas, profits, tangible assets and the mean industry average were significant, with size, sales and age being insignificant (column 5). These results provide some evidence that the less developed the region, the less the pecking order theory can explain the loan structure of private firms.

Results for wholly-owned state firms are reported in Table 5. Profit is the only significant variable across all three regions. In the inland area, it is the only significant variable and most likely represents policy lending, as these firms are mostly unprofitable. The

coefficients are very large, and again most likely reflect governments' desire to keep these companies operating. For state firms in inland areas, the only significant variable is the return on assets. For the northeast, firm age and assets also matter.

Finally, table 6 presents the results for the mixed ownership firms. The results for the coastal and inland areas are similar, with profits, assets and the industry median being significant. Again, the capital structure of mixed ownership firms is explained partially by the theory, but not as well as the private sector. In the case of the northeast, however, the F statistic is not significant, indicating there is a very poor fit indeed.

The main finding from the regional estimations is that leverage ratios are determined differently across regions for all ownership types, which leads us to reject H4. The northeast region (which includes three provinces, Heilongjiang, Liaoning and Jilin) fits the theoretical expectation the least well, while the coastal results are the best. The coastal results for private firms fit the theory very well, as suggested by H5. The Li et al. (2009) study also found that firms in coastal areas had less leverage. However, this result was contrary to their expectations because they did not apply the pecking order theory.

(Insert Tables 4-6 here)

Discussion & Conclusion

Overall our results show that different ownership types and firms located in different regions do not have the same determinants of leverage. The pecking order theory explains private firms' leverage determinants the best, especially for the SMEs, as compared with other ownership forms, and regionally, the fit is best in the more marketized coast. Our results reject H1-H4 since there were clear differences in the determinants of leverage between ownership types, age of firms and across regions, and that large private firms did not behave in similar ways as state-owned firms.

Other studies on China's banking sector have suggested that lending has increasingly been tied to expectations about good performance as banks may be subject to increasing costs associated with non-performing loans and bankrupt firms. For example, Firth et al. (2009) find that more profitable firms have higher loan ratios using 2002 firm survey data and Yeung (2009) finds via interviews that bank management is increasingly sensitive to risk and therefore wary of making loans without good information. Our results suggest something different is going on, at least for the manufacturing sector. In all of our estimates the profit variable was negative and significant, suggesting that the more profitable a firm, the lower their loan to asset ratio. So while state firms may be more likely to have loans than other ownership forms as reported by Li et al. (2009), our results suggest that the more profitable firms of all ownership types have lower loan ratios. If a firm can avoid taking a loan from a bank, they seem to prefer to self-finance or use other forms of financing. Based on her study of listed firms, Chen (2004) interprets this situation as firms having a different pecking order, if allowed. That is, they would prefer to self-finance first, but then would prefer equity financing over bank loans. Her reasoning is based on the fact that both the companies she is studying and the banks lending to them are state-owned, hence equity financing is low cost and relatively unconstrained since the only shareholder that

matters is the government. Ni and Yu (2008, p.111) also point out that equity financing is preferable for listed firms since there are high costs to entering the corporate bond market and the inefficient banking system may be a deterrent to borrowing. In our study most of the firms, regardless of ownership, do not have the equity option, and if they did, the preference might vary depending on ownership form. In any case, the fact that there are more firms that would like to list compared with the number allowed raises the value of listing, as does the high value given to the non-tradable shares of listed companies (Huang & Song 2006, pp.25, 27).

Our results raise a puzzle related to tangible assets. In general it is thought that firms with a higher ratio of tangible assets to total assets are more likely to receive bank loans because they will have more tangible assets to put up as collateral. However, we find a fairly consistent, significantly negative relationship between the tangible asset ratio and the loan ratio. So again, firms that might be expected to more easily qualify for bank loans do not use them in the case of manufacturing firms in China in the 2000s.

The story behind these results is no doubt quite complex, and the analysis is complicated by missing variables. For example, it may be that banks prefer to loan to the better governed firms as suggested by Firth et al. (2009), but these firms may also be the more profitable ones. With the data that we have, we are not able to sort out these possible effects. Nonetheless, the overall results of our study suggest that private firms in China are making leverage decisions as would be expected of firms in a market business environment as described by the pecking order theory. State-owned firms, and even firms of mixed ownership, reveal a different story. These results are consistent with results on listed firms, as reported in Liu et al. (2011), which are largely state-controlled. The determinants of leverage for the state firms may be better understood with policy and political variables rather than what we expect from market-oriented,

profit maximizing firms with hard budget constraints.

Further limitations with respect to this study include the time frame covered and the available variables. This survey data set ends in 2006 just as a new round of financial sector reforms was launched that included building bond markets in China (Walter and Howie 2011). However, the response to the financial crisis in 2009 apparently reversed much of the progress that was initiated. In any case, the short time span, 2003-06, of the survey available to us cannot capture the rapidly changing financial environment in China. Limitations on the variables also make it difficult to explore key questions such as the reasons for the very large importance of short-term relative to long-term debt in the Chinese context, the role of tangible assets in firms' decision-making, and how the lack of development of a bond market affects firms' behavior. These are all areas for future research.

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Appendix: **Table A1: Descriptive Statistics – Variable Means, 2003-2006**

Variable	Wholly SOEs	Mixed SOEs	Private Only	All Firms	Regional Comparison								
					Wholly SOEs only			Mixed SOEs			Private		
					1 NE	2 Coast	3 Inland	1 NE	2 Coast	3 Inland	1 NE	2 Coast	3 Inland
Long-term loans to total assets	.15	.06	0.04	.05	.14	.12	.17	.06	.05	.09	.04	.03	.06
Short-term Loans to total assets	.46	.51	.53	.51	.48	.47	.45	.52	.53	.48	.50	.55	.45
Total loans to total assets	.62	.58	.58	.56	.63	.6	.64	.58	.58	.58	.55	.59	.53
Sales (1,000,000 Yuan)	174.8	133.79	38.71	97.66	195	197	155	213	131	124	34.42	392.29	38.05
Employees (number)	598.06	424.88	169.8	327.14	932.17	460.7	639.71	568.03	355.79	519.73	150	164.54	191.67
Firm Age (Years)	27.34	11.47	6.4	9.32	27	27.81	27.06	11.05	11.41	11.69	6.53	6.44	6.41
Firm Age (log)	3.04	2.03	1.56	1.83	2.99	3.0	3.03	1.95	2.08	1.97	1.51	1.57	1.51
Profitability (ROA)	.01	.08	.11	.08	-.003	0.01	.006	.02	.09	.08	.08	0.11	0.11
Tangible Assets (% of total assets)	.48	.35	0.36	0.36	0.49	0.43	.52	.37	.32	.40	0.41	0.34	0.41

Industry Median leverage	.04	.005	.00	.004	.03	.03	.04	.004	.003	.008	.00	.00	.001

Appendix: **Table A2: Descriptive Statistics – Variable Medians, 2003-2006**

Variables	Wholly SOEs	Mixed SOEs	Private	All Firms	Regional Comparison								
					Wholly SOEs Only			Mixed SOEs			Private		
					1 NE	2 Coast	3 Inland	1 NE	2 Coast	3 Inland	1 NE	2 Coast	3 Inland
Long-term Loans to total assets	.03	0	0	0	0	0.008	0.07	0.0	0.0	0	0.0	0	0
Short-term Loans to total assets	.45	.51	.55	.51	.48	.46	.44	.52	.54	.47	.50	.58	.44
Total loans to total assets	.63	.6	.6	.59	.64	.6	.64	.6	.6	.59	.56	.62	.53
Sales (1,000,000 yuan)	11.09	22.07	16.4	20.1	10.9	12.1	12.4	18.6	22.15	22.76	14	16.47	16.8
Employees (number)	167	140	97	142	173	145	181	137	170	126	82	94	110
Firm Age (years)	26	8	6.43	6	23.5	25	27	7	8	7	4	5	4
Firm Age (log)	3.26	2.08	1.61	1.79	3.18	3.22	3.3	1.95	2.07	1.95	1.61	1.61	1.61
Profitability (ROA)	.001	0.03	0.04	0.03	0	0.00	0.00	0.05	0.04	0.02	0.03	0.05	0.05
Tangible Assets (% of total assets)	.48	0.32	0.33	0.33	0.5	0.41	0.53	0.34	0.29	0.38	0.39	0.31	0.40
Industry Median leverage	0	0	0	0	0	.0	.0	0	0	0	0	0	0

Appendix: **Table A3: Descriptive Statistics – Mean Ratios of Total Loans to Total Assets by Ownership**

Register type code	Organizational Form	2003		2004		2005		2006	
		Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean
110	Whole Stated Owned	13,979	0.63	14,701	0.63	13,144	0.62	10,922	0.61
120	Collectively-owned	12,867	0.58	14,128	0.58	13,576	0.55	10,615	0.55
130	stock cooperative enterprises	6,724	0.60	6,863	0.60	6,767	0.58	5,209	0.57
140	jointly operated enterprises	1,120	0.56	1,138	0.56	1,039	0.55	838	0.56
150	limited liability companies	19,725	0.60	34,372	0.60	37,610	0.58	35,638	0.58
160	companies limited by shares	4,611	0.57	5,996	0.56	6,383	0.56	5,572	0.55
171	Private firm - a sole proprietorship	11,926	0.56	20,116	0.56	23,936	0.53	22,061	0.53
172	private cooperative enterprises	2,565	0.53	4,583	0.53	5,248	0.50	4,734	0.51
173 &174	private limited liability companies & private companies limited by shares	30,730	0.59	71,269	0.60	80,808	0.58	78,481	0.58
190	other domestic enterprises	253	0.54	262	0.58	862	0.54	582	0.56
	All firms	135,362	0.57	221,818	0.58	240,569	0.56	223,104	0.56

Appendix: **Table A4: Descriptive Statistics – Median Ratios of Total Loans to Total Assets by Ownership**

Register type code	Organizational Form	2003		2004		2005		2006	
		Obs	Median	Obs	Median	Obs	Median	Obs	Median
110	Whole Stated Owned	13,979	0.63	14,701	0.63	13,144	0.62	10,922	0.61
120	Collectively-owned	12,867	0.59	14,128	0.59	13,576	0.56	10,615	0.56
130	stock cooperative enterprises	6,724	0.62	6,863	0.62	6,767	0.59	5,209	0.58
140	jointly operated enterprises	1,120	0.58	1,138	0.58	1,039	0.56	838	0.58
150	limited liability companies	19,725	0.62	34,372	0.62	37,610	0.60	35,638	0.60
160	companies limited by shares	4,611	0.59	5,996	0.58	6,383	0.57	5,572	0.56
171	Private firm - a sole proprietorship	11926	0.58	20,116	0.58	23,936	0.53	22,061	0.53
172	private cooperative enterprises	2,565	0.54	4,583	0.54	5,248	0.49	4,734	0.51
173 &174	private limited liability companies & private companies limited by shares	30,730	0.62	71,269	0.63	80,808	0.61	78,481	0.61
190	other domestic enterprises	253	0.57	262	0.62	862	0.54	582	0.56
	All firms	135,362	0.59	221,818	0.59	240,569	0.57	223,104	0.57

Table 1: Standard variables in the pecking order theory with expected signs

Dependent variable: leverage = total loans/total assets	
Variable	**Expected sign**
Profit	-
Financial slack/liquid assets	-
Growth prospects	-
Firm size	+
Firm assets	+
Industry leverage average	+
Firm age	+/-

Source: Based on Cole (2008).

Table 2: Estimation Results, Private Firms
Dependent Variable: Ratio of Short-term Loans to Total Assets, 2003-2006

(1) Regressors (symbol)	(2) Variable	(3) Private Firms, All	(4) Private Firms, Large	(5) Private Firms, SME
$Profit_{it}$	Return on Assets (lagged)	-.046*** (.0048)	-.025*** (.008)	-.039*** (.0070)
$Sales_{it}$	Sales revenue (lagged)	-2.95e-08** (1.25e-08)	-2.08e-08* (1.16e-08)	-5.32e-07*** (1.02e-07)
$Size_{it}$	Number of employees	.00001 (6.20e-06)	1.71e-06 (6.49e-06)	.00003*** (.00001)
$Assets_{it}$	Ratio of tangible assets to total assets (lagged)	-.0455*** (.007)	-.052*** (.0128)	-.0323*** (.009)
$AveLV_{it}$	Median loans to total assets (lagged)	.1*** (.02)	.084** (.036)	.06** (.0269)
Age_{it}	Log of firm age (lagged)	-.008*** (.0017)	-.0036 (.0029)	-.007*** (.002)
Constant		.507*** (.013)	.52*** (.023)	.53*** (.0170)
# Obs.		128,782	38,030	90,752
# of firms		102,035	30,445	75,194
Adj. R-square		.123	.1	.087
F-stat		34.82***	6.48***	25.6***

Note: Standard errors are reported in parentheses; * denotes 10% significance level, ** 5% significance level, *** 1% significance levels; large private firms are defined as those with assets valued at 20,714 Yuan or more.

Table 3: Estimation Results, State-Owned Enterprises
Dependent Variable: Ratio of Short-term Loans to Total Assets, 2003-2006

(1) Regressors (symbol)	(2) Variable	(3) SOE Wholly-owned	(4) SOE Wholly-owned Young,	(5) SOE Mixed,	(6) SOE Mixed Young
$Profit_{it}$	Return on Assets (lagged)	-.159*** (.0184)	-.252*** (.07)	-.101*** (.0078)	-.132*** (.012)
$Sales_{it}$	Sales revenue (lagged)	3.27e-09 (2.53e-09)	-8.95e-09 (1.52-08)	2.72e-10 (1.34e-09)	1.77e-09 (2.99e-09)
$Size_{it}$	Number of employees	1.78e-06 (1.63e-06)	.00003*** (.00001)	-5.70e-07 (1.16e-06)	1.09e-06 (2.15e-06)
$Assets_{it}$	Ratio of tangible assets to total assets (lagged)	-.047*** (.013)	-.003 (.077)	-.032*** (.0079)	-.043*** (.012)
$AveLV_{it}$	Median loans to total assets (lagged)	.013 (.022)	-.033 (.077)	.09*** (.022)	.08** (.033)
Age_{it}	Log of firm age (lagged)	-.003 (.0043)	-.01 (.0082)	-.0007 (.0017)	.0017 (.002)
Constant		.48*** (.021)	.497*** (.056)	.48*** (.0141)	.48*** (.02)
# Obs.		21,788	2863	84,054	45,116
# of firms		14,568	2227	61,491	35,424
Adj. R-square		.08	.001	.068	.06
F-stat		14.45***	3.25***	35.59***	23.62***

Note: Standard errors are reported in parentheses; * denotes 10% significance level, ** 5% significance level, *** 1% significance levels.

Table 4: Estimation Results, Private Firms by Region
Dependent Variable: Ratio of Short-term Loans to Total Assets, 2003-2006

(1) Regressors (symbol)	(2) Variable	(3) Private Firms, Coast	(4) Private Firms, Northeast	(5) Private Firms, Inland
$Profit_{it}$	Return on Assets (lagged)	-.0417*** (.0051)	-.199*** (.048)	-.058*** (.0128)
$Sales_{it}$	Sales revenue (lagged)	-2.43e-08* (1.29e-08)	-2.71e-07*** (1.01e-07)	-2.54e-08 (4.60e-08)
$Size_{it}$	Number of employees	.0000 (7.07e-06)	.0001** (.00004)	2.25e-06 (.0000)
$Assets_{it}$	Ratio of tangible assets to total assets (lagged)	-.0312*** (.008)	-.0879** (.035)	-.08*** (.0163)
$AveLV_{it}$	Median loans to total assets (lagged)	.08*** (.0231)	.18* (.1096)	.147*** (.051)
Age_{it}	Log of firm age (lagged)	-.0087*** (.0019)	-.001 (.0082)	-.004 (.0037)
Constant		.5379*** (.0149)	.44*** (.067)	.42*** (.0308)
# Obs.		94,964	6,509	27,283
# of firms		74,360	5,333	22,327
Adj. R-square		.102	.07	.124
F-stat		22.66***	7.45***	10.22***

Note: Standard errors are reported in parentheses; * denotes 10% significance level, ** 5% significance level, *** 1% significance levels.

Table 5: Estimation Results, State-Owned Firms by Region
Dependent Variable: Ratio of Short-term Loans to Total Assets, 2003-2006

(1) Regressors (symbol)	(2) Variable	(3) SOE Wholly-owned, Coast	(4) SOE Wholly-owned, Northeast	(5) SOE Wholly-owned, Inland
$Profit_{it}$	Return on Assets (lagged)	-.237*** (.0278)	-.16** (.07)	-.103*** (.0260)
$Sales_{it}$	Sales revenue (lagged)	6.19e-09 (3.96e-09)	-1.39e-09 (4.66e-09)	3.38e-09 (4.44e-09)
$Size_{it}$	Number of employees	-9.48e-08 (4.52e-06)	1.84e-06 (2.04e-06)	1.77e-06 (3.17e-06)
$Assets_{it}$	Ratio of tangible assets to total assets (lagged)	-.06*** (.020)	-.13*** (.0447)	-.027 (.0180)
$AveLV_{it}$	Median loans to total assets (lagged)	-.0145 (.029)	.067 (.08)	.04 (.035)
Age_{it}	Log of firm age (lagged)	.007 (.007)	-.03** (.014)	-.0044 (.0058)
Constant		.48*** (.03)	.59*** (.07)	.45*** (.0309)
# Obs.		8,536	2,086	11,158
# of firms		5,648	1,476	7,447
Adj. R-square		.042	.1467	.09
F-stat		14.09***	3.15***	3.42***

Note: Standard errors are reported in parentheses; * denotes 10% significance level, ** 5% significance level, *** 1% significance levels.

Table 6: Estimation Results, Mixed Ownership SOE Firms by Region
Dependent Variable: Ratio of Short-term Loans to Total Assets, 2003-2006

(1) Regressors (symbol)	(2) Variable	(3) SOE Mixed, Coast	(4) SOE Mixed, Northeast	(5) SOE Mixed, Inland
$Profit_{it}$	Return on Assets (lagged)	-.086*** (.0089)	-.108** (.0437)	-.14*** (.0162)
$Sales_{it}$	Sales revenue (lagged)	1.33e-09 (1.68e-09)	-8.99e-10 (2.87e-09)	-3.54e-09 (4.00e-09)
$Size_{it}$	Number of employees	5.02e-07 (1.47e-06)	-2.77e-06 (4.29e-06)	-2.5e-06 (2.19e-06)
$Assets_{it}$	Ratio of tangible assets to total assets (lagged)	-.02* (.0105)	-.0200 (.0315)	-.051*** (.0133)
$AveLV_{it}$	Median loans to total assets (lagged)	.07*** (.027)	.13 (.095)	.099** (.0395)
Age_{it}	Log of firm age (lagged)	-.0020 (.0022)	-.0008 (.0063)	.0005 (.0026)
Constant		.49*** (.0178)	.45*** (.06)	.45*** (.025)
# Obs.		50,265	5,797	27,949
# of firms		36,409	4,317	20,751
Adj. R-square		.05	.06	.07
F-stat		18.32***	1.47	18.13***

Note: Standard errors are reported in parentheses; * denotes 10% significance level, ** 5% significance level, *** 1% significance levels.